Conservation Management Plan for the Dwarf Galaxias (*Galaxiella pusilla*) – Western Highway Project: Section 2 Beaufort to Ararat, Victoria



Dwarf galaxias habitat in Billy Billy Creek at Buangor

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EXECUTIVE SUMMARY

Streamline Research was commissioned by VicRoads to prepare a Conservation Management Plan for the dwarf galaxias (*Galaxiella pusilla*). A pre-construction targeted investigation has provided an understanding of the dwarf galaxias distribution between Beaufort and Ararat so that appropriate mitigation measures for the preservation and potential enhancement of habitat for the species can occur with the Western Highway Duplication.

The principal environmental objectives of the Conservation Management Plan is to:

- provide operator awareness of the dwarf galaxias during the works program
- provide, protect and maintain favourable aquatic habitat
- preserve existing flooding characteristics and aquatic passage
- preserve water quality conditions (both for the dwarf galaxias and other native fish species)
- protect and maintain vegetation in and adjacent to aquatic habitat
- monitor the dwarf galaxias population during and after road construction

The Conservation Management Plan is divided into two main sections, Section 1 providing general information on the dwarf galaxias and Section 2 outlining preservation measures that can be used to ensure the construction of the new road is conducted without interference to any dwarf galaxias population or known habitat for the species.

VicRoads approach to environmental management is to avoid potential impacts, and where possible it will minimise potential impacts through appropriate design and construction techniques.

Implementation of the Conservation Management Plan for the dwarf galaxias will also provide protection to other aquatic fauna and flora aquatic values, and is be considered in conjunction with all other environmental requirements for the Western Highway Project: Section 2, Beaufort to Ararat, Victoria.

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1.0 INTRODUCTION

In April 2014, the federal Department of the Environment (DoE) assessed that the proposed works for the Western Highway Project Section 2 – Beaufort to Ararat (EPBC referral 2010/5741) are 'a controlled action' under the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act, 1999.

Commonwealth approval is subject to a revision of the Threatened Species Management Plan (Ecology and Heritage Partners, 2013) for conservation and enhancement of the spiny rice-flower, button wrinklewort, golden sun moth and dwarf galaxias. A copy of Commonwealth Approval Conditions and the Streamline Research letter addressing issues for the dwarf galaxias (*Galaxiella pusilla*) is included in Appendix 1.

This document provides a Conservation Management Plan (CMP) specific to the dwarf galaxias (*Galaxiella pusilla*) for the construction and operational stages of the upgrade of the Western Highway. It provides appropriate mitigation measures for the preservation of dwarf galaxias populations and habitat.

Section 1 of this report provides general information on the dwarf galaxias. Section 2 outlines appropriate mitigation measures that can be applied to minimise interference to dwarf galaxias populations or known habitat for the species and addresses pre-requisite information requested by DoE.

The principal environmental objectives of this CMP is to:

- provide operator awareness of the dwarf galaxias during the works program
- provide, protect and maintain favourable aquatic habitat
- preserve existing flooding characteristics and aquatic passage
- preserve water quality conditions (both for the dwarf galaxias and other native fish species)
- protect and maintain vegetation in and adjacent to aquatic habitat
- monitor the dwarf galaxias population during and after road construction

The format and content in this dwarf galaxias CMP is similar to that of the dwarf galaxias CMP for the Princes Highway Duplication Traralgon to Kilmany (EPBC referral 2010/5640) and the South Gippsland Highway Upgrade (EPBC referral 2009/4959).

1.1 Watercourses

The proposed works for the duplication of the Western Highway between Beaufort and Ararat is located near the top of the Hopkins Basin (Figure 1).

The Hopkins Basin is bound by the Great Dividing Range to the north and by the Grampians Ranges to the north-west (Department of Water Resources, 1989). It extends approximately 160 kilometres from its' northern boundary to the Southern Ocean and is approximately 60 kilometres wide (Department of Water Resources, 1989). The main waterway is the Hopkins River, which has two large tributaries, Fiery and Mt. Emu Creeks.



Figure 1. The location of the Western Highway duplication in the Hopkins River Basin.

The named waterways crossing the proposed alignment of the upgrade of the Western Highway between Beaufort and Ararat are shown in Figure 2.

Waterways between Beaufort (in the east) and Ararat (in the west) include a number of small unnamed channels, as well as some named watercourses. A headwater stream of Trawalla Creek (a tributary of Mt. Emu Creek), is crossed at several locations near Beaufort. Fiery Creek and a number of tributaries; Middle, Charliecombe and Billy Billy Creeks are then crossed before reaching the township of Buangor. The Hopkins River plus the tributaries of Gorrin, Greenhills and Cemetery Creeks are crossed between Buangor and Ararat.

All of the waterways that cross the Western Highway between Beaufort and Ararat have either intermittent or ephemeral streamflow. Fiery, Middle, Charliecombe and Billy Billy Creeks and the Hopkins River are all expected to have intermittent streamflow due to their proximity to the top of the Hopkins Basin. The headwater creeks of Trawalla Creek, plus the tributaries of Fiery, Middle, Charliecombe and Billy Billy Creeks are all ephemeral streams.



(base map - reproduction from VicRoads Country Street Directory)

Figure 2. Waterways to be crossed between Beaufort and Ararat.

1.2 Priority waters

Targeted surveys for the dwarf galaxias were conducted in May 2014 as part of the federal government request for providing supporting evidence on the baseline condition of dwarf galaxias populations and habitat within the project area (DoE, 2014). Survey points are shown on maps in Appendix 2. Pictures of each site are shown in Appendix 3 and Appendix 4 lists the name of the waterway, and provides a topographical grid reference.

Priority waters for the preservation of dwarf galaxias populations and habitat for the Western Highway Project Section 2 – Beaufort to Ararat can be divided into two types of waters:

- 1. Waters which currently support dwarf galaxias populations
- 2. Waters which have habitat which could potentially support dwarf galaxias (but there is no known record of a population)

Waters which currently support the dwarf galaxias

For the dwarf galaxias, Fiery Creek and Billy Billy Creek are the most important waterways in the Western Highway study area between Beaufort to Ararat. Populations of dwarf galaxias were recorded in both creeks in the targeted investigation in May 2014. Habitat in both creeks is considered of high conservation value.

Extremely dry conditions in recent years has limited the habitat occupied by dwarf galaxias. The only pool found to support dwarf galaxias in Fiery Creek was approximately two by three metres and approximately one metre in depth (Photograph 1). In Billy Billy Creek, only one remnant pool (at the existing highway) was found to support dwarf galaxias. The pool was approximately 50 metres in length, 10 metres wide and several metres in depth (Photograph 2).

Water which may have habitat which could potentially support dwarf galaxias

The majority of waters between Beaufort and Ararat are not capable of providing habitat for the long term support of dwarf galaxias populations. All are intermittent or ephemeral, and most regularly dry out.

During extremely wet periods it is possible for dwarf galaxias from permanent populations (Fiery Creek and Billy Billy Creek) to have connectivity to waters like Middle and Charliecombe Creeks. If fish do happen to venture into these waters, establishment is expected to be short lived, as both Middle and Charliecombe Creeks can dry out.

Under extremely wet condition it is possible that the population of dwarf galaxias known to exist in Mt. Emu Creek (near the township of Trawalla, 10 kilometres east of Beaufort) could move into Trawalla Creek, and from there into the headwater tributaries near Beaufort. If dwarf galaxias were to find passage into the Trawalla Creek tributaries near Beaufort, they would die when the streams dry out.



Photograph 1. The one pool of Fiery Creek where dwarf galaxias were present in May 2014.



Photograph 2. Billy Billy Creek at the existing Western Highway bridge, dwarf galaxias were present here in May 2014.

The effect of drying and poor connectivity on dwarf galaxias populations is evident in Billy Billy Creek. Dwarf galaxias were recorded in the crossing of the creek to the west of Buangor, at the Western Highway at Buangor and 100 metres south at the railway in 2012 (Ecology and Heritage Partners, 2012). In May 2014, Billy Billy Creek was dry to the west of Buangor. No dwarf galaxias were found in the pools to the north of Buangor or in pools near the rail line. It is expected that the pools have been dry until recently, and that populations of dwarf galaxias formerly found in these habitats have been lost during dry conditions. Despite recent rains providing surface water, there has not been connectivity to allow movement of dwarf galaxias from the one permanent water habitat in Billy Billy Creek at the Western Highway at Buangor.

1.3 Waterway crossings and potential impacts on dwarf galaxias

The proposed works for waterway crossings for the duplication of the Western Highway Section 2 includes the construction of bridges for waterways with large streamflow and the use of culverts for watercourses that have lower streamflows.

Bridge crossings are planned for Fiery, Middle and Charliecombe Creeks and the Hopkins River, as has previously existed at these locations. Culverts are planned for all smaller tributaries.

A new bridge crossing is planned for Fiery Creek (see Appendix 4). It will be located immediately to the south of the existing bridge. The existing bridge is to be demolished.

A bridge crossing of Billy Billy Creek has been designed (see Appendix 4) for the new crossing of Billy Billy Creek (Figures 3 and 4), approximately 600 metres north of the existing Western Highway bridge over Billy Billy Creek at Buangor. The existing bridge location is the critical habitat which was found to support the dwarf galaxias population (no works are proposed at this location).

The realignment of Billy Billy Creek at the new bridge crossing location will result in the removal and modification of a small section of habitat (approximately 60-80 m in length) which can occasionally be used by dwarf galaxias. Adjacent creek habitat will be protected by 'No Go Zones' during the works. Loss of existing instream and riparian habitat is expected to result in the short term decline of water quality due to increased sediment loading, accelerating existing erosion issues and modification to the hydrological regime. An appropriate planning regime will be developed in accordance with the Glenelg Hopkins Catchment Management Authority (GHCMA) which includes the following:

- Pre-construction approval by GHCMA of bridge crossing design drawings and construction details demonstrating how impacts on waterway health will be minimised.
- GHCMA Works on Waterways Licence application and compliance with licence conditions for the construction of the waterway crossing over Billy Billy Creek.

Culverts are planned for the Billy Billy crossing of the Western Highway to the west of Buangor, approximately two kilometres further upstream (see Appendix 4). The new culverts will be located adjacent to existing culverts at this location.

For dwarf galaxias it is not a matter of whether a bridge or culvert is used to cross a waterway, but whether dispersal of dwarf galaxias can occur during flood periods. Fish passage is, therefore, the main priority at road crossings. If streamflow remains unimpeded by road structures dwarf galaxias movement will not be restricted and opportunity for establishment in new habitat will be possible in floods.

If appropriate mitigation measures are developed and implemented, waterway crossings will have no impacts on dwarf galaxias populations or habitat between Beaufort and Ararat.



Photograph 3. Billy Billy Creek on new alignment to the north of Buangor, view north.



Photograph 4. Billy Billy Creek on new alignment to the north of Buangor, view south.

1.4 Assessment of impact under Significant Impact Criteria Guidelines

The following discussion assesses the impact of the Western Highway Duplication between Beaufort and Ararat on the dwarf galaxias based on the Commonwealth's Significant Impact Criteria Guidelines (Department of the Environment, Water, Heritage and the Arts, 2009).

a. *lead to a long term decrease in the size of an important population.*

Unlikely – the existing dwarf galaxias population in the Hopkins River Basin is extensively fragmented. The small populations that are known to occur in Fiery Creek and Billy Billy Creek will not be adversely affected by duplication of the Western Highway construction work. 'No Go Zones' will effectively exclude workers and machinery from interfering with dwarf galaxias habitat.

b. *reduce the area of occupancy of an important species.*

Unlikely – minimal or no disturbance will occur to known habitat for the dwarf galaxias with appropriate 'No Go Zones' and protective fencing to protect against erosion and riparian vegetation damage.

c. fragment an important population into two or more populations.

Unlikely – fragmentation is not likely to occur to either the Fiery Creek or Billy Billy Creek dwarf galaxias populations. For Fiery Creek, bridge construction is to occur to the north of the known habitat. In Billy Billy Creek works are planned for a dry streambed, isolated from a downstream dwarf galaxias population. Connectivity in both Fiery and Billy Billy Creeks will not be compromised during road construction.

d. *adversely affect habitat critical to the survival of the species.*

Unlikely - For Fiery Creek, bridge construction is to occur to the north of known habitat, in an area that is currently restricted to small saline pools that do not support the dwarf galaxias. In Billy Billy Creek works are planned for a dry reach of the creek. In both instances, the reaches are not critical habitat.

e. *disrupt breeding cycle of an important population.*

Unlikely – the works are to take place in areas which currently do not support dwarf galaxias populations. Even if wet conditions allowed for movement of dwarf galaxias from known populations into these areas, 'No Go Zones' and protective fencing will protect stream habitat.

f. modify, destroy, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Unlikely – no loss of habitat will occur during the construction period. 'No Go Zones' will protect habitat that could potentially be used by dwarf galaxias. No existing habitat is likely to be lost that would result in the decline of the species.

g. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat.

Unlikely – the most problematic species, the eastern gambusia (*Gambusia holbrooki*) is already present in the waters occupied by dwarf galaxias. The interaction between the two species will not be changed by Western Highway Duplication construction work.

h. *introduce disease that may cause the species to decline.*

Unlikely – no unforeseen diseases are likely to be accidentally introduced.

i. *interfere substantially with the recovery of the species.*

Unlikely – no unforeseen circumstances are expected to interfere with any potential re-establishment of dwarf galaxias into habitat formerly occupied by the species.

Overall, the Western Highway Duplication between Beaufort and Ararat is unlikely to result in a significant impact on the dwarf galaxias caused by:

- A long term decrease in the size of an important population or significant reduction in the overall known habitat of an important population,
- Isolation or fragmentation of an important population or critical habitat; or
- The introduction of predatory or invasive fish (they are already present within the construction area).

Implementation of appropriate mitigation measures (Section 2 of this report) will minimise any impact on dwarf galaxias populations and habitat.

1.5 Consultation

This dwarf galaxias CMP has been developed with input from a variety of stakeholders. Organisations include those involved with decisions on the most suitable alignment for the Western Highway Duplication between Beaufort and Ararat.

Stakeholders consulted include:

- Department of Environment and Primary Industries (DEPI)
- Glenelg Hopkins Catchment Management Authority (GHCMA)
- Southern Rural Water
- Ararat Rural City Council
- Pyrenees Shire
- Department of the Environment (DoE)

SECTION 1

2.0 DWARF GALAXIAS GENERAL INFORMATION

2.1 Status

The dwarf galaxias is considered of national significance and is listed as vulnerable under the EPBC Act, 1999. In Victoria, the dwarf galaxias is considered an endangered threatened species (Department of Sustainability and Environment (DSE), 2013) and is listed for protection under the Flora and Fauna Guarantee (FFG) Act, 1988.

2.2 Description

The dwarf galaxias is a small native fish species (maximum size of 50 mm) which has an exclusive freshwater lifecycle. The species is sexually dimorphic, the males are smaller and more slender than the females, having three longitudinal black stripes along each side of the trunk, and a distinct red strip between the mid and lower black strip. The black stripes are less distinct or absent in females (Cadwallader and Backhouse, 1983). Figure 3 shows an example of both a male and female dwarf galaxias.

The dwarf galaxias is a short lived species, with only a few individuals surviving through to a second year. The spawning period is mainly between winter and spring, but can extend throughout summer when conditions are favourable. Spawning adults are typically over 25 mm in size. Recently hatched young are about 10 mm in size.



Figure 3. Dwarf galaxias.

2.3 Past Known Distribution

There is only a few records of dwarf galaxias known for waterways that cross the Western Highway.

One historical record is known for the Hopkins River in 1904 (in Ecology and Heritage Partners, 2012).

The dwarf galaxias has been captured in Mt. Emu Creek near the Trawalla township in 2011, but has not been recorded in past few years when the water has been surveyed (Rhys Coleman pers. comm. 2014).

In Fiery Creek dwarf galaxias have been recorded immediately downstream of the Western Highway as recently as three years ago (Chris Bloink, pers. comm. 2014) and also further south near Skipton over the past decade (Department of Sustainability and Environment, 2010*, Rhys Coleman pers. comm. 2014).

For Billy Billy Creek dwarf galaxias were recorded at three sites in and around Buangor in surveys conducted in June 2011 and January 2012 as part of the ecological assessment for the Western Highway Project (Ecology and Heritage Partners, 2012).

With potential for drought conditions to have dried waters since the 2011 and 2012 surveys (Ecology and Heritage Partners, 2012), Streamline Research provided an up-to-date survey in Map 2014; a survey that specifically targeted waterways for the presence/absence of dwarf galaxias.

2.4 Targeted survey

Streamline Research undertook the targeted dwarf galaxias investigation for all waterways that cross the proposed route of the duplication of the Western Highway between Beaufort to Ararat on 22-23 May, 2014.

A total of 41 watercourses were examined. Appendix 2 shows aerial maps between Beaufort and Ararat marking the survey points. Appendix 3 shows photographs of each of the watercourses and Appendix 3 shows the topographical map reference of each location. Nine locations had surface water, which could be sampled for dwarf galaxias.

The fish survey technique used was dip netting, as the technique can be very effective for the capture of dwarf galaxias and a large number of locations can be surveyed in a day. The study was conducted under permit and licence approval from the Department of Environment and Primary Industries.

^{*} database has not been updated since 2010

Table 1 lists the fish species present at surveyed locations. In total four fish species were recorded, three native species and one introduced species. The native species recorded included the dwarf galaxias, the southern pygmy perch (*Nannoperca australis*) and the mountain galaxias (*Galaxias olirus*). The one exotic fish species recorded was the eastern gambusia.

Dwarf galaxias were only recorded at two locations; Fiery Creek (site 10) and Billy Billy Creek (site 26). Southern pygmy perch and mountain galaxias were present in both Fiery Creek (site 10) and Middle Creek (site 13).

No fish were recorded at six of the survey locations (sites 3, 6, 8, 18, 25 and 27), presumably because these locations had, until recently been dry. Recent rain has provided surface water but has not been connected to remnant pools that have supported fish populations.

| SITE No. | LOCATION | WATERWAY | NO FISH | NATIV | VE FISH SPEC | CIES | EXOTIC FISH SPECIES |
|-------------|--------------------------|-------------|---------|-------------------|----------------------------|----------------------|------------------------|
| | | | PRESENT | dwarf galaxias | southern pygmy perch | mountain galaxias | eastern gambusia |
| 3 | Trawalla Creek tributary | pools | Х | | | | |
| 6 | Fiery Creek tributary | 2 farm dams | X | | | | |
| 8 | Fiery Creek tributary | farm dam | X | | | | |
| 10 | Fiery Creek | pools | | Х | Х | X | Х |
| 13 | Middle Creek | pools | | | Х | X | |
| 18 | Charliecombe Creek | one pool | Х | | | | |
| 25 | Billy Billy Creek | pools | Х | | | | |
| 26 | Billy Billy Creek | pools | | Х | | | X |
| 27 | Billy Billy Creek | pools | Х | | | | |

 Table 1. Fish species captured at each survey site.

The majority of the waters on the proposed alignment for the Western Highway were found to be ephemeral or intermittent and as such can only be used temporarily, if at all, by dwarf galaxias.

With appropriate mitigation measures road works can be conducted without adversely affecting dwarf galaxias populations or their habitat.

2.5 Habitat requirements

The dwarf galaxias occurs in waters which have an array of native aquatic vegetation, typically preferring swampy floodplain environments, but can also be found in creeks and rivers. The natural degree of wetland connectivity to a more permanent waterbody (such as a river or creek) may be vital to their long term survival (particularly during extended dry conditions) and must be considered as part of the habitat requirement critical to survival (Saddlier *et al.*, 2008).

Dwarf galaxias can be found in two types of habitats, primary habitats which have permanent water, and secondary habitats which have intermittent or ephemeral water regimes. Primary habitats (permanent water sites) are responsible for the long term survival of the species (McGuckin, 2001).

Dwarf galaxias can establish self sustaining populations in secondary habitats, but these populations can be lost when the habitat dries out. Recolonisation of dwarf galaxias into these habitats is reliant on the movement of fish from primary habitat.

The species is opportunistic, using floodplains for the movement of fish from primary habitat into new habitats (secondary habitat) for range extensions during flood events. New environments are advantageous as they can provide food for the growth of young and often, have an absence of predators. Spawning has been noted in seemingly unsustainable habitats like puddles created by vehicle wheel marks, pools in low lying grassed paddocks, sand pits and farm dams. Long term persistence in these environments is largely dependent on permanent water remaining at the location.

Although dwarf galaxias were recorded at three locations in Billy Billy Creek in 2011 and 2012 (Ecology and Heritage Partners, 2012), the absence of the species from pools north of Buangor and south at the rail line in the May 2014 survey, suggests that neither of these areas are primary habitat for the dwarf galaxias.

Critical habitat for the dwarf galaxias in Billy Billy Creek is the pool beneath the existing Western Highway at Buangor. The dwarf galaxias population in this pool is most likely responsible for the long term persistence of the species in Billy Billy Creek.

The presence of only a small number of dwarf galaxias in Fiery Creek (approximately 20), tends to indicate that the pool habitat is not critical to the species. It is suspected that the area is only secondary habitat for the dwarf galaxias and primary habitat (which is yet to be found) is likely to be the source of fish found in the pool near the Western Highway.

2.6 Populations under threat

With the exception of secure populations in places like Discovery Bay National Park and the Grampians National Park, most populations of dwarf galaxias in Victoria are under threat. Many wetland habitats throughout the range of the species have been destroyed or modified as part of agriculture or residential development.

The type of threats applying to particular populations depend largely on land tenure and management (Saddlier *et al.*, 2008). Unfortunately, the majority of populations occur at sites that have little or no formal protection.

The dwarf galaxias population in Fiery and Billy Billy Creeks is currently given no formal protection. With the discovery of the population, both the Department of Environment and Primary Industries and the Glenelg Hopkins Catchment Management Authority have been notified. It is now the responsibility of the Department of Environment and Primary Industries to oversee protection of dwarf galaxias habitat for the long term survival of the species.

2.7 Threatening processes

There is a number of threatening processes applicable to the dwarf galaxias which are identified in the Victorian FFG Act 1988 (Victorian Government, 1988). The Victoria's Biodiversity Strategy (Department of Natural Resources and Environment, 1997) outlines key environmental considerations necessary for the preservation of the species.

Victorian FFG Act 1988

Potentially threatening processes listed under Schedule 3 of the FFG Act, 1988 applicable to the dwarf galaxias are:

- Alteration to the natural flow regimes of rivers and streams
- Alteration to the natural temperature regimes of rivers and streams
- Degradation of native riparian vegetation along Victorian rivers and streams
- Increase in sediment input into Victorian rivers and streams due to human activities
- Habitat fragmentation as a threatening process for fauna in Victoria
- Input of toxic substances into Victorian rivers and streams
- Prevention of passage of aquatic biota as a result of the presence of instream structures

Victorian Biodiversity Strategy

Under the Victorian Biodiversity Strategy the conservation and maintenance of dwarf galaxias populations and habitat can be achieved by:

- Maintaining and where necessary restoring ecological processes and biodiversity dependent upon freshwater environments
- Preventing further preventable decline in the viability of any rare species or of any rare ecological community
- Increasing the viability of threatened species and the extent and quality of threatened ecological communities

2.8 Management strategies

The National Recovery Plan for the dwarf galaxias (Saddlier *et al.*, 2008) summarises appropriate management strategies to avoid threatening processes. These include:

- No direct loss of habitat through wetland drainage on either public or private land
- No physical alteration to dwarf galaxias habitat as a consequence of land adjoining dwarf galaxias habitat
- No further damage to riparian vegetation
- Damaged or depleted riparian vegetation is protected and (if necessary) supplemented by active revegetation works
- Plans to clear vegetation lying adjacent to dwarf galaxias habitat will not impact upon water quality (no increase in sedimentation/nutrient levels/pesticides/herbicides etc.)
- Proposals to translocate aquatic species into dwarf galaxias habitat are subject to relevant risk management processes according to relevant national and State guidelines

All of the strategies from the National Recovery Plan (listed above) are considered relevant to the Western Highway Duplication between Beaufort and Ararat and have been adopted in the dwarf galaxias CMP.

SECTION 2

3.0 PRESERVATION MEASURES

3.1 Environmental controls to protect aquatic habitat

All waterways are to be protected from potential instream degradation due to road works.

A number of environmental controls used by VicRoads to protect aquatic conditions are important to the protection of dwarf galaxias populations and habitat. 'No Go Zones' will exclude works from occurring in Fiery and Billy Billy Creeks; in locations where dwarf galaxias have been recorded in May 2014 and waterways intersecting the Western Highway Duplication which currently support the dwarf galaxias. The 'No Go Zones' will effectively exclude workers and machinery from interfering with dwarf galaxias habitat. They also provide an effective method of avoiding impact on the breeding and dispersal of dwarf galaxias.

Documentation with respect to the finding of dwarf galaxias in Fiery Creek and appropriate mitigation measures for bridge construction are discussed in Appendix 5. Attachments includes detailed design, 'No Go Zones' and erosion and sediment controls that have been approved by the federal Department of the Environment, and as such, are not requirement for further discussion in this document.

The design drawing and 'No Go Zones' for the Billy Billy Creek bridge crossings to the north of Buangor are shown in Appendix 6. The design drawing of the culvert crossing on the Western Highway to the west of Buangor is also shown in Appendix 6.

For Billy Billy Creek permanent 'No Go Zones' will be fenced off once the bridge abutments have been constructed. Summer period works would include erection of 'No Go' fencing, creek realignment and bridge abutment construction. Once bridge abutment completion 'No Go Zones' extended to 1.5 metres of abutment wall. A temporary culvert crossing will be constructed according to GHCMA permit requirements.

'No Go Zones' are to be clearly demarcated with high visibility (ie. par webbing or flags) and appropriate signage (ie. Protected Area – No Unauthorised Access). The fencing is to remain in place and be checked weekly or after any rain event for the duration of the construction period. Damaged fencing must be repaired/replaced immediately or as soon as practicable.

The realignment of Billy Billy Creek will result in the removal and modification of a small section of creek immediately to the north of survey point 24, which is known to be habitat for dwarf galaxias. Specific mitigation measures can only be developed for the dwarf galaxias when functional design has been completed. The design concept for the realignment of the creek will form part of a Works on Waterway application to the GHCMA. The Environmental Management Plan (EMP) is to be developed by the contractor/s in consultation with the Department of Environment and Primary Industries (DEPI), the Ararat Rural City Council, and then submitted to, and endorsed by the Secretary of the Department of Transport, Planning and Local Infrastructure (DTPLI) or delegate.

The EMP for Billy Billy Creek will be prepared for construction activities to protect aquatic attributes in accordance with any necessary permits, the State Environment Protection Policy (Waters of Victoria) and EPA best practice guidelines. It will address:

- The establishment of a 'No Go Zone' of Billy Billy Creek while the diversion is being constructed;
- The construction and stabilisation of the realigned creek prior to allowing flows to pass through the creek; and
- The establishment of mitigation measures as identified in Section 3.2 prior to the commencement of bridge construction.

3.2 Mitigation measures for Billy Billy Creeks

Key considerations of environmental mitigation measures specific to dwarf galaxias are:

- Installation and maintenance of erosion and sedimentation controls are to be in accordance with the Victorian Environment Protection Authority (EPA) best practice guidelines including Environmental Guidelines for Major Construction Sites (1996) and Construction Techniques for Sediment Pollution Control (1991) and Doing it Right on Subdivisions (2004).
- Erosion and sediment controls need to be adaptive and may change as works progress. Implementation will be conducted in accordance with the Principals of Best Practice of the EPA guidelines. Controls need to be monitored at intervals of at least once weekly, during and after rain events. Any defects or deficiencies in control measures identified by monitoring shall be rectified immediately. Control measures shall be cleaned, repaired and augmented as required to ensure effective control thereafter.
- Refilling of vehicles and machinery shall be made in a designated area no closer than 100 metres from any drainage point or waterway.
- Fuel and chemicals are to bunded to EPA guidelines and stored outside of flood zones at a minimum of 100 m from waterways. Storage and handling of fuels and chemicals is to be in accordance with Material Safety Procedures. Monitoring for compliance must be made at intervals of at least once weekly and after rain events. A contingency plan shall address containment, treatment and disposal of any spill.
- Construction personnel must undertake an induction to understand the importance of 'No Go Zones' for the protection of high priority dwarf galaxias waters.

- Water quality shall be monitored upstream and downstream of the construction site in Billy Billy Creeks at least once weekly, during and after rain events. The monitoring program is to start at the commencement of construction and continue until construction activities are completed. *Insitu* measurements of temperature pH, dissolved oxygen, electrical conductivity and turbidity are to be made.
 - Methodology to be adopted shall be in accordance with EPA Publication 441 A Guide to the Sampling and Analysis of Waters, Wasterwaters, Soils and Wastes. The contractor/s EMP shall include methodology detail for water quality monitoring as outlined in Appendix 7.

3.3 Fiery Creek bridge removal

After completion of the new Western Highway bridge at Fiery Creek the existing bridge is to be removed. Demolition will be carried out from top down. Barriers and railing will be first removed, followed by deck beams, crossheads and finally the piers. It is likely that the piers will be cut off or broken down to just above ground/water level to avoid disturbing the sediments. The contractor is expected to provide containment structures to prevent any debris from entering the Fiery Creek channel and to avoid/minimise disturbance of the banks.

3.4 Corrective actions and contingency measures

During works, a clear indication needs to made to construction personnel of expected mitigation measures and importance to maintaining ecological values. Direct disturbance like unplanned movement of construction equipment or indirect disturbances like spills from machinery could have a detrimental effect on habitat that can be used by the dwarf galaxias. Compliance of mitigation practices during the construction period will be checked by VicRoads. Non compliance issues need to be addressed.

Contractors need to have contingency for reporting accidents (disturbance to aquatic habitat) that may impact on waterways. A chain of command between construction personnel, VicRoads and a qualified biologist is needed to report problems and to provide appropriate on-ground responses.

Monitoring following an incident will comprise a survey and appropriate sampling to confirm the extent of the disturbance to aquatic habitat. For spillages, post incident monitoring will be repeated at weekly intervals until the contaminant is no longer considered to be a threat.

Monitoring will be performed by a suitably qualified aquatic biologist. An interpretative report will be prepared for each monitoring exercise and distributed to the Department of Environment and Primary Industries and other interested parties.

3.5 Post construction monitoring

A post construction survey for dwarf galaxias is to made 12 months after completion of the road works. It will be inclusive of all known habitats in Fiery and Billy Billy Creeks in which dwarf galaxias have been identified in the recent targeted investigation and in the surveys conducted in June 2011 and January 2012 (Ecology and Heritage Partners, 2012).

Five locations, four of which dwarf galaxias have previously been recorded, will be resurveyed as part of post construction monitoring. One location will be on Fiery Creek and the remaining four on Billy Billy Creek.

Fiery Creek

• immediately to the south of the Western Highway

Billy Billy Creek

- At the Western Highway
- At the rail bridge, Buangor
- Approximately 600 metres north of Buangor, on the new alignment of the Western Highway
- the road crossing several kilometres to the west of Buangor township

The primary purpose of the monitoring is to determine that there has been no change to dwarf galaxias populations or habitat as a direct result of the Western Highway Duplication between Beaufort and Ararat. The monitoring will provide an assessment of the impacts, if any, of the works.

Should any new dwarf galaxias habitat be found, details of the location shall be reported to DEPI and DoE and 'No Go Zones' established immediately to protect against any habitat disturbance. A qualified aquatic biologist/zoologist shall be engaged to investigate the findings and prepare a report outlining management actions required.

When road duplication is to be undertaken in the vicinity of the Hopkins River another targeted dwarf galaxias survey is to be made to ascertain the presence/absence of the species in the river near the Western Highway (the area is currently dry). If dwarf galaxias are not found in the area, no action will be necessary. If dwarf galaxias are found, management actions similar to those to be used at Billy Billy Creek will also be used for the Hopkins River bridge crossing.

3.6 Additional conditions in relation to approval

As discussed in the Introduction (page 1), this report provides information to address Approval Conditions associated with EPBC Referral 2010/5741 relating to action necessary for minimising impact to dwarf galaxias populations and habitat.

Table 2 summarises additional considerations in relation to management actions specified in the Approvals Notice which are considered to be unwarranted or unnecessary (as detailed in the Streamline Research P/L letter in Appendix 1).

| Item No. | DoE Approval condition | Recommendation and comment |
|------------|--|--|
| 4 (b) iv. | -a commitment to avoid construction activities within Hopkins River or Billy Billy Creek crossings during the dwarf galaxias breeding period (from 1 April to 30 November in any year) | Not recommended -'No Go Zones' will ensure that no actions taken for road construction are expected to prevent or restrict dwarf galaxias breeding. -The Hopkins River has not had a known population of the dwarf galaxias in the past century and recent investigation found no water in the main channel within 5 km of the proposed bridge crossing. |
| 4 (b) v. | -a procedure for isolating Dwarf Galaxias habitat, and procedure for salvage and relocating dwarf galaxias, in the event that construction activities occur within dwarf galaxias habitat | Not recommended - 'No Go Zones' will be sufficient to protect dwarf galaxias populations and habitats. -Salvaging considered inappropriate for this project as impact to <i>dwarf galaxias</i> habitat is expected to be minimal. |
| 4 (b) vii. | -a plan and schedule for revegetation, rehabilitation and weed removal works within dwarf galaxias habitat, including establishment of in-stream habitat with suitable features such as woody debris and native riparian and aquatic species impacted by the proposed action | Not recommended -Given that dwarf galaxias habitat will not be compromised by the proposed works, revegetation and rehabilitation should not be required. -Instream conditions will remain unchanged by bridgeworks. |

4.0 ACKNOWLEDGEMENTS

I would like to thank Harry Ostapiw from VicRoads for giving Streamline Research the opportunity to conduct a dwarf galaxias investigation between Beaufort and Ararat. Harry assisted with the provision of the base maps which have been used in this report. Michael Wickerson, Harry Ostapiw and Frank Kauhausen made valuable comments on earlier drafts of this report.

Rhys Coleman from Melbourne Water is also thanked for sharing findings from his dwarf galaxias surveys in Western Victoria. Chris Bloink from Ecology Australia is thanked for sharing information on locations where he has captured dwarf galaxias in and near the study area. Finally Dave Lucas is thanked for his field assistance.

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Appendix 1. Commonwealth Decision and Action Taken

ustralian Government Department of the Environment EPBC Ref: 2010/5741 Mr Michael McCarthy Project Director - Western Highway Project VicRoads PO Box 148 WENDOUREE VIC 3355 Dear Mr McCarthy **Decision on approval** Western Highway Project Section 2 - Beaufort to Ararat, Victoria (EPBC 2010/5741) I am writing to you in relation to a proposal to upgrade the Western Highway between Beaufort and Ararat, Victoria. I have considered the proposal in accordance with Part 9 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and have decided to grant an approval to Roads Corporation, trading as VicRoads. The details of my decision are attached. The proposal must be undertaken in accordance with the conditions specified in the approval. I would appreciate your assistance by informing me when you start the action, and provide the various management plans and offset agreements specified in the conditions. Please also provide details of who will be the contact person responsible for the administration of the approval decision. Please note any plans required as conditions of approval will be regarded as public documents unless you provide sufficient justification to warrant commercial-in-confidence status. You should also note that this EPBC Act approval does not affect obligations to comply with any other laws of the Commonwealth, state or territory that are applicable to the action. Neither does this approval confer any right, title or interest that may be required to access land or waters to take the action. The Department has an active audit program for proposals that have been referred or approved under the EPBC Act. The audit program aims to ensure that proposals are implemented as

planned and that there is a high degree of compliance with any associated conditions. Please note that your project may be selected for audit by the department at any time and all related records and documents may be subject to scrutiny. Information about the department's compliance monitoring and auditing program is enclosed.

I have also written to the following parties to advise them of this decision:

| State authority | The Hon Matthew Guy MLC Victorian Minister for Planning |
|-----------------------|--|
| Commonwealth Minister | The Hon Warren Truss MP Minister for Infrastructure and Regional Development |

GPO Box 787 Canberra ACT 2601 * Telephone 02 6274 1111 * Facsimile 02 6274 1666 www.environment.gov.au The Department has recently published an *Environmental Impact Assessment Client Service Charter* (the Charter) which outlines the Department's commitments when undertaking environmental impact assessments under the EPBC Act. A copy of the Charter can be found at: http://www.environment.gov.au/epbc/publications/index.html. Should you have any feedback on the environmental impact assessment process, please send them through to EIAclientfeedback@environment.gov.au.

If you have any questions about this decision, please contact the project manager, Amanda Young, by email to <u>amanda.young@environment.gov.au</u>, or telephone 6274 1299 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

de

Mahani Taylor Acting Assistant Secretary South-Eastern Australia Environment Assessments Branch ↓ ∓ April 2014



Australian Government Department of the Environment

APPROVAL

Western Highway Project Section 2 - Beaufort to Ararat, Victoria (EPBC 2010/5741) This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act* 1999.

| Person to whom the approval is granted | Roads Corporation, trading as VicRoads | |
|--|--|--|
| Proponent's ACN (if applicable) | ABN:61 760 960 480 | n an |
| Proposed action | To upgrade the Western Highway between Bea [See EPBC Act referral 2010/5741]. | ufort and Ararat, Victoria |
| Approval decision | | |
| Controlling Provision | | Decision |
| Listed threatened specie | es and communities (sections 18 & 18A) | Approved |
| Conditions of approva This approval is subject | I to the conditions specified below. | |
| This approval has affast | | |
| Decision maker | until 30 June 2034 | |
| Decision maker Name and position | Mahani Taylor Acting Assistant Secretary South-Eastern Australia Environment Assessme | ents Branch |
| Decision maker Name and position Signature | Mahani Taylor Acting Assistant Secretary South-Eastern Australia Environment Assessme | ents Branch |
| Decision maker Name and position Signature Date of decision | Mahani Taylor Acting Assistant Secretary South-Eastern Australia Environment Assessme Made 17/4/14- | ents Branch |
| Decision maker Name and position Signature Date of decision Conditions attached to | Mahani Taylor Acting Assistant Secretary South-Eastern Australia Environment Assessme 17/4/14 | ents Branch |
| Decision maker Name and position Signature Date of decision Conditions attached to To minimise impacts of | Mahani Taylor Acting Assistant Secretary South-Eastern Australia Environment Assessme 17/4/14 o the approval construction on listed threatened species and ecol | ents Branch |
| Decision maker Decision maker Name and position Signature Date of decision Conditions attached to To minimise impacts of 1. The person taking t project area as illu | Mahani Taylor Acting Assistant Secretary South-Eastern Australia Environment Assessme //////////////////////////////// | ents Branch ogical communities: |
| Decision maker Name and position Signature Date of decision Conditions attached to To minimise impacts of 1. The person taking t project area as illu | Mahani Taylor Acting Assistant Secretary South-Eastern Australia Environment Assessme <u>17/4/14</u> o the approval construction on listed threatened species and ecol the action must ensure that the action does not occ strated at <u>Annex 1</u> . | ents Branch ogical communities: |
| Decision maker Name and position Signature Date of decision Conditions attached to To minimise impacts of 1. The person taking t project area as illu | Mahani Taylor Acting Assistant Secretary South-Eastern Australia Environment Assessme 17/4/14 o the approval construction on listed threatened species and ecol the action must ensure that the action does not occ strated at <u>Annex 1</u> . | ents Branch ogical communities: cur outside of the |

- The person taking the action must ensure that project activities do not impact more than five (5) Spiny Rice-flower plants.
- The person taking the action must ensure the approved Weed Management Plan is implemented.
- 4. The person taking the action must in consultation with a suitably qualified ecologist revise the Threatened Species Management Plan(s) for the conservation and enhancement of the Spiny Rice-flower, Button Wrinklewort, Golden Sun Moth habitat, and Dwarf Galaxias habitat in accordance with the requirements set out below, and submit the revised plan(s) for the Minister's approval. Construction activities must not commence within 100m of each of the matters identified above (as illustrated in <u>Annex 1</u>) until the Minister approves the revised plan(s) in relation to that matter.
 - a) base line data and other supporting evidence that documents the baseline condition of populations of Spiny Rice-flower, Button Wrinklewort, Golden Sun Moth and Dwarf Galaxias habitat and populations within the project area;
 - b) specific management actions to maintain and/or improve Spiny Rice-flower, Button Wrinklewort, Golden Sun Moth, and Dwarf Galaxias populations and habitat within the project area, including but not limited to details of:
 - i. establishing no-go zone(s) with a minimum 3m buffer around Spiny Rice-flower patch(s), Button Wrinklewort patch(s), Golden Sun Moth habitat, and Dwarf Galaxias habitat to be avoided. Clearly marking no-go zone(s) with high-visibility fencing and signage for at least the duration that construction activities are within 100m of the no-go zone(s);
 - ii. a plan and schedule for revegetation, rehabilitation and weed removal works for the improvement of **Golden Sun Moth habitat** impacted by the proposed action;
 - iii. how any pipes, culverts and/or bridges constructed within **Dwarf Galaxias habitat** will not restrict habitat connectivity or hinder the dispersal of **Dwarf Galaxias**;
 - a commitment to avoid construction activities within Hopkins River or Billy Billy Creek crossings during the Dwarf Galaxias breeding period (from 1 April to 30 November in any year);
 - a procedure for isolating Dwarf Galaxias habitat, and procedure for salvage and relocating Dwarf Galaxias, in the event that construction activities occur within Dwarf Galaxias habitat;
 - vi. the method and schedule for water quality monitoring of Dwarf Galaxias habitat during construction activities;
 - vii. a plan and schedule for revegetation, rehabilitation and weed removal works within Dwarf Galaxias habitat, including establishment of in-stream habitat with suitable features such as woody debris and native riparian and aquatic species;
 - viii. implementing sediment, erosion and pollution control protocols, in accordance with Construction Techniques for Sediment Pollution Control (EPA Publication No. 275, 1991); and Environmental Guidelines for Major Construction Sites (EPA Publication No. 480, February 1996); and

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| | ix. ensuring chemicals and fuels are stored and handled in accordance with the relevant Material Safety Data Sheets. Ensuring chemicals and fuels are not stockpiled within 100m of waterways, and a spill kit must be kept onsite for the duration of construction. Implementing an emergency response procedure in the event of a chemical or fuel spill near waterways. |
|-----|---|
| | c) information and commitments about monitoring and reporting on the improvements in the condition of the project area; and |
| | corrective actions and contingency measures to be implemented where monitoring under the Threatened Species Management Plan(s) indicates a degradation of Spiny Rice- flower, Button Wrinklewort, Golden Sun Moth habitat, and/or Dwarf Galaxias habitat. |
| 5. | The person taking the action must ensure the approved Threatened Species Management Plan(s) is implemented. |
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| Gra | assy Eucalypt Woodland of the Victorian Volcanic Plain (GEWVVP) |
| 6. | The person taking the action must ensure that construction activities do not impact more than 11.14 ha of GEWVVP . |
| 7. | Unless approved by the Minister , the person taking the action must establish a 33.5 ha GEWVVP Offset at the Dunkeld Property , to compensate for the loss of GEWVVP . Within 9 months of the date of this approval, the person taking the action must: |
| | a) enter into Agreement with the landowner under section 173 of the Planning and Environment Act 1987, or a Trust for Nature covenant mechanism to secure a 33.5 ha GEWVVP Offset at the Dunkeld Property; |
| | b) provide the Department with a signed copy of the Agreement and evidence of lodgement with the Titles Office, within 2 weeks of lodgement; |
| | c) provide the Department with the offset attributes, shapefile and map(s) clearly defining the location and boundaries of the GEWVVP Offset, within 2 weeks of lodgement; and |
| | ensure that the Agreement is registered on the title on which the GEWVVP Offset is located. The Department must be provided with evidence of registration within 2 weeks of registration. |
| 8. | Within 9 months of the date of this approval, the person taking the action must submit a draft GEWVVP Offset Management Plan to the Department for the Minister's approval. The GEWVVP Management Plan must be prepared in consultation with a suitably qualified ecologist and provide for the conservation and enhancement of GEWVVP within the GEWVVP Offset(s), and must include details of: |
| | base line data and other supporting evidence that documents the baseline condition of GEWVVP on the GEWVVP Offset(s); |
| | b. description, key performance indicator, and timeframe for implementing specific management actions to improve the condition of GEWVVP within the GEWVVP Offset(s), including but not limited to control of weed and pest species, control of access to the protected land, strategic fire and grazing management (acknowledging that such impacts may be positive or negative depending on circumstances); |
| | |
| | Page 3 of 11 |
| | |

| | c. measures to ensure that actions taken have no detrimental impact on the populations or habitat of other listed threatened species and communities that are likely to occur or utilise |
|------|--|
| | the GEWVVP Offset(s); |
| | d. information and commitments about monitoring and reporting on the improvements in condition of the offset site; and |
| | corrective actions and contingency measures to be implemented where monitoring under the GEWVVP Offset Management Plan indicates a degradation of the GEWVVP. |
| Э. | The person taking the action must ensure the GEWVVP Offset(s) is managed in accordance with the approved GEWVVP Offset Management Plan for a period of at least 10 years from the date of execution of the Agreement . |
| Vatu | tural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) |
| 10. | The person taking the action must ensure that construction activities do not impact more than 5.25 ha of NTGVVP . |
| 11. | Unless approved by the Minister , the person taking the action must establish a 20.3 ha NTGVVP Offset at the Darlington Property to compensate for the loss of NTGVVP . Within 9 months of the date of this approval, the person taking the action must: |
| | a) enter into Agreement with the landowner under section 173 of the Planning and Environment Act 1987, or a Trust for Nature covenant mechanism to secure a 20.3 ha NTGVVP Offset at the Darlington Property; |
| | b) provide the Department with a signed copy of the Agreement and evidence of lodgement with the Titles Office, within 2 weeks of lodgement; |
| | c) provide the Department with the offset attributes, shapefile and map(s) clearly defining the location and boundaries of the NTGVVP Offset, within 2 weeks of lodgement; and |
| | ensure that the Agreement is registered on the title on which the NTGVVP Offset is located. The Department must be provided with evidence of registration within 2 weeks of registration. |
| 12. | Within 9 months of the date of this approval, the person taking the action must submit a draft NTGVVP Offset Management Plan to the Department for the Minister's approval. The NTGVVP Offset Management Plan must be prepared in consultation with a suitably qualified ecologist and provide for the conservation and enhancement of the viability of the population of NTGVVP within the NTGVVP Offset, and must include: |
| | a) baseline data and other supporting evidence that documents the baseline quality of NTGVVP within the NTGVVP Offset Management Plan; |
| | b) description, key performance indicator, and timeframe for implementing specific management actions to improve the condition of NTGVVP within the NTGVVP Offset Management Plan, including but not limited to control of weed and pest species, control of access to the protected land, strategic fire and grazing management (acknowledging that such impacts may be positive or negative depending on circumstances); |
| | |
| | Page 4 of 11 |

- c) measures to ensure that actions taken have no detrimental impact on the populations or habitat of other listed threatened species and communities that are likely to occur or utilise the NTGVVP Offset Management Plan;
- d) information and commitments about monitoring and reporting on the improvements in condition of the offset site; and
- corrective actions and contingency measures to be implemented where monitoring under the NTGVVP Offset Management Plan indicates a degradation of the NTGVVP.
- 13. The person taking the action must ensure the NTGVVP Offset is managed in accordance with the approved NTGVVP Offset Management Plan for a period of at least 10 years from the date of execution of the Agreement.

Golden Sun Moth

- 14. The person taking the action must ensure that construction activities does not impact more than 31.56 ha of known Golden Sun Moth habitat.
- 15. Unless approved by the Minister, the person taking the action must establish a 100 ha Golden Sun Moth Offset at the Darlington Property to compensate for the loss of Golden Sun Moth habitat. Within 9 months of the date of this approval, the person taking the action must:
 - a) provide the Department with evidence that the property(s) identified to form the basis of the Golden Sun Moth Offset contain a viable population of Golden Sun Moth, and at least 100 ha of known Golden Sun Moth habitat. Property(s) must be surveyed in accordance with EPBC Act policy statement 3.12 - significant impact guidelines for the critically endangered golden sun moth (Synemon plana) by a suitably qualified ecologist;
 - b) enter into Agreement with the landowner under section 173 of the *Planning and* Environment Act 1987, or a Trust for Nature covenant mechanism to secure a 100 ha Golden Sun Moth Offset of known Golden Sun Moth habitat at the Darlington Property;
 - c) provide the Department with a signed copy of the Agreement and evidence of lodgement with the Titles Office, within 2 weeks of lodgement;
 - d) provide the Department with the offset attributes, shapefile and map(s) clearly defining the location and boundaries of the Golden Sun Moth Offset, within 2 weeks of lodgement; and
 - ensure that the Agreement is registered on the title on which the Golden Sun Moth Offset is located. The Department must be provided with evidence of registration within 2 weeks of registration.
- 16. Within 9 months of the date of this approval, the person taking the action must submit a draft Golden Sun Moth Offset Management Plan to the Department for the Minister's approval. The Golden Sun Moth Offset Management Plan must be prepared in consultation with a suitably qualified ecologist and provide for the conservation and enhancement of Golden Sun Moth within the Golden Sun Moth Offset(s), and must include details of:

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- c) measures to ensure that actions taken have no detrimental impact on the populations or habitat of other listed threatened species and communities that are likely to occur or utilise the NTGVVP Offset Management Plan;
- d) information and commitments about monitoring and reporting on the improvements in condition of the offset site; and
- corrective actions and contingency measures to be implemented where monitoring under the NTGVVP Offset Management Plan indicates a degradation of the NTGVVP.
- 13. The person taking the action must ensure the NTGVVP Offset is managed in accordance with the approved NTGVVP Offset Management Plan for a period of at least 10 years from the date of execution of the Agreement.

Golden Sun Moth

- 14. The person taking the action must ensure that construction activities does not impact more than 31.56 ha of known Golden Sun Moth habitat.
- 15. Unless approved by the Minister, the person taking the action must establish a 100 ha Golden Sun Moth Offset at the Darlington Property to compensate for the loss of Golden Sun Moth habitat. Within 9 months of the date of this approval, the person taking the action must:
 - a) provide the Department with evidence that the property(s) identified to form the basis of the Golden Sun Moth Offset contain a viable population of Golden Sun Moth, and at least 100 ha of known Golden Sun Moth habitat. Property(s) must be surveyed in accordance with EPBC Act policy statement 3.12 - significant impact guidelines for the critically endangered golden sun moth (Synemon plana) by a suitably qualified ecologist;
 - b) enter into Agreement with the landowner under section 173 of the *Planning and* Environment Act 1987, or a Trust for Nature covenant mechanism to secure a 100 ha Golden Sun Moth Offset of known Golden Sun Moth habitat at the Darlington Property;
 - c) provide the Department with a signed copy of the Agreement and evidence of lodgement with the Titles Office, within 2 weeks of lodgement;
 - d) provide the Department with the offset attributes, shapefile and map(s) clearly defining the location and boundaries of the Golden Sun Moth Offset, within 2 weeks of lodgement; and
 - ensure that the Agreement is registered on the title on which the Golden Sun Moth Offset is located. The Department must be provided with evidence of registration within 2 weeks of registration.
- 16. Within 9 months of the date of this approval, the person taking the action must submit a draft Golden Sun Moth Offset Management Plan to the Department for the Minister's approval. The Golden Sun Moth Offset Management Plan must be prepared in consultation with a suitably qualified ecologist and provide for the conservation and enhancement of Golden Sun Moth within the Golden Sun Moth Offset(s), and must include details of:

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| a) | baseline data and other supporting evidence that documents the baseline condition and extent of Golden Sun Moth habitat and population viability on the Golden Sun Moth Offset(s); |
|-------------------------------------|--|
| b) |) description, key performance indicator, and timeframe for implementing specific management actions to improve the condition of Golden Sun Moth habitat within the Golden Sun Moth Offset(s) , including but not limited to control of weed and pest species, control of access to the protected land, strategic fire and grazing management (acknowledging that such impacts may be positive or negative depending on circumstances); |
| c) | measures to ensure that actions taken have no detrimental impact on the populations or habitat of other listed threatened species and communities that are likely to occur or utilise the Golden Sun Moth Offset(s); |
| d) |) information and commitments about monitoring and reporting on the improvements in condition of the offset site; and |
| e) | corrective actions and contingency measures to be implemented where monitoring under the Golden Sun Moth Offset Management Plan indicates a degradation of Golden Sun Moth habitat. |
| 17. T ac le | he person taking the action must ensure the Golden Sun Moth Offset(s) is managed in ccordance with the approved Golden Sun Moth Offset Management Plan for a period of at east 10 years from the date of execution of the Agreement. |
| Contin | ngency condition for offsets |
| 18. If or di a si fo | the GEWVVP Offset as per <u>condition 7</u> , and/or the NTGVVP Offset as per <u>condition 11</u> , and/ r the GSM Offset as per <u>condition 15</u> cannot be secured as an offset within 9 months of the ate of this approval, and/or if information required by <u>condition 15(a)</u> fails to demonstrate viable population of Golden Sun Moth at the Darlington Property to the Department's atisfaction, the person taking the action must establish a Contingency Offset(s) with Trust or Nature for the residual offset requirements of the relevant condition. |
| a. | within 10 months of the date of this approval, the person taking the action must provide the Department with a proposal for the Contingency Offset(s) , for the Department's approval. The proposal must include a copy of the draft Agreement with Trust for Nature that documents the property(s) identified to form the basis of the Contingency Offset(s) , prior to signature by any parties. The plan must also include details of how the size and quality of the matters present at the site of the proposed Contingency Offset(s) will provide for the residual offset requirements of this approval, supported by surveys in accordance with the Department's quidelines and by a suitable qualified accomparit, and |

- b. within 24 months of the date of this approval, the person taking the action must:
 - enter into a written Agreement with Trust for Nature that documents the property(s) agreed by the Department to form the basis of the Contingency Offset(s). The person proposing to take the action must provide the Department with a signed copy of the Agreement and within 7 days of signature by all parties;

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| | ii. | ensure that the properties(s) identified by Trust For Nature to form the basis of the | |
|-------|------------|--|---|
| | | Contingency Offset(s) are surveyed in accordance with relevant survey guidelines | |
| | | by a suitably qualified ecologist to determine the baseline quality; | |
| | iii. | provide Trust for Nature with \$50,000 Australian dollars per hectare, for the number | |
| | | of hectares required by the Department for the Contingency Offset(s) (the funds), | |
| | | at which time the money will form the basis of the payment to purchase environmental | |
| | | services from the landowner of the Contingency Offset(s). If the cost of purchasing | |
| | | the environmental services is greater than the funds, the person taking the action | |
| | | must provide additional funds to Trust for Nature as required. If the cost of | |
| | | purchasing the environmental services is less than the funds, the remaining funds | |
| | | must be returned to the person taking the action. The arrangements for the provision | |
| | | and expenditure of the funda mast be set out in the Agreement, | |
| | IV. | under the Nature Conservation Trust Act 1972 to secure Contingency Offset(s) | |
| | | and of the Nature School value in the circle of the Credit Tradier Assessment within | |
| | V. | 2 weeks of its signature by all parties: | • |
| | | 2 weeks of its signature by an particip, | |
| | VI. | Ensure that a Deed of Covenant for the Contingency Offset(s) is executed with Truest for Nature and is registered on the title documents of the site of the | |
| | | Contingency Offset(s) within 6 months of the date of signing the Credit Trading | |
| | | Agreement | |
| | vii. | provide the Department with evidence of registration within 2 weeks of registration; | |
| | viii. | provide the Department with the offset attributes, shapefile and map clearly | |
| | | defining the location and boundaries of the Contingency Offset(s), within 2 weeks of | |
| | | registration; and | |
| | ix. | provide a Contingency Offset Management plan to the Department for the | |
| | | Minister's approval. The person taking the action must ensure that any Contingency | |
| | | Offset(s) are managed in accordance with an approved Contingency Offset | |
| | | Agreement | |
| | | | |
| A -1- | | | |
| Adn | ninistrati | ve conditions | |
| 19. | Within 3 | 30 calendar days after the commencement of construction activities, the person | |
| | constru | ne action must advise the pepartment in writing of the actual date of commencement | |
| 20 | The | mon taking the extian must maintain accurate records substantiating all activities | |
| 20. | associa | ated with or relevant to the conditions of approval including measures taken to | |
| | implem | ent management plans and make them available upon request to the Department . | |
| | Such re | ecords may be subject to audit by the Department or an independent auditor in | |

accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.

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- 21. Within three months of June 30 each year following the commencement of construction activities, the person taking the action must publish an annual report of compliance on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non compliance with any of the conditions of this approval must be provided to the Department at the same time as the annual report of compliance is published. The annual report of compliance must document the outcomes of the management plan(s) against the performance indicators of the management plan(s).
- 22. The person taking the action must notify the **Department** in writing of any non compliance with conditions as soon as practicable and no later than 2 business days of becoming aware of the non compliance.
- 23. Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.
- 24. If the person taking the action wishes to carry out any activity otherwise than in accordance with management plans as specified in the conditions, the person taking the action must submit to the **Department** for the **Minister's** written approval a revised version of that management plan. The varied activity shall not commence until the **Minister** has approved the varied management plan in writing. The **Minister** will not approve a varied management plan unless the revised management plan would result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised management plan, that management plan must be implemented in place of the management plan originally approved.
- 25. If the Minister believes that it is necessary or convenient for the better protection of listed threatened species and ecological communities and wetlands of international importance to do so, the Minister may request that the person taking the action make specified revisions to the management plans specified in the conditions and submit the revised management plans for the Minister's written approval. The person taking the action must comply with any such request. The revised approved management plans must be implemented. Unless the Minister has approved the revised management plans then the person taking the action must continue to implement the management plans originally approved, as specified in the conditions.
- 26. Unless otherwise agreed to in writing by the Minister, the person taking the action must publish a copy of each approved management plan referred to in these conditions of approval on their website within 1 month of approval of the management plan. Each management plan(s) must be accessible to general members of the public for a period of at least 10 years from the date of approval of the management plan(s). Any variations to management plans must be published on the website within 1 month of the variation being approved by the Minister
- 27. If, at any time after 5 years from the date of this approval, the person taking the action has not substantially commenced the action, then the person taking the action must not substantially commence the action without the written agreement of the Minister.

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Definitions:

- Agreement the executed agreement between the person taking the action and the relevant landowner, to secure the land in perpetuity.
- ii. Button Wrinklewort the native plant species *Rutidosis leptorrhynchoides*, protected under the EPBC Act.

iii. Button Wrinklewort patch(s) - the patch(s) of habitat for the Button Wrinklewort within the project area as illustrated at <u>Annex 1</u>.

- iv. Construction activities all works associated with changes within the project area; including impacting native vegetation, the erection of any onsite temporary structures, the use of heavy duty equipment for the purpose of breaking the ground for buildings or infrastructure, grading land for flood mitigation and ancillary works. Construction activities do not include the maintenance and use of existing access tracks, works to prepare the land for revegetation.
- Contingency Offset Management plan the document developed by a suitably qualified ecologist to the satisfaction of the Department, detailing the long-term management of EPBC Act listed threatened species and ecological communities of the Contingency Offset(s).
- vi. Contingency Offset(s) land secured in perpetuity to compensate for residual impacts on EPBC Act listed threatened species and ecological communities.
- vii. Credit Trading Agreement the legal agreement between Trust for Nature and the person taking the action and the property owner of the protected land. The agreement stipulates the obligations of each party, including financial payments, to manage the protected land for a period of 10 years.
- Vili. Darlington Property the paddock within the property 'Terrinallum South', 833 Carranballac - Darlington Road, Darlington Victoria, as illustrated at <u>Annex 2</u>.
- ix. Deed of Covenant an encumbrance registered to Trust for Nature on the title of the protected land and includes the Offset Management Plan and any other document that the owner of the protected land is required to comply with.
- x. Department the Australian Government department administering the EPBC Act.
- xi. **Dunkeld Property** the paddock within the property 6640 Glenelg highway, Dunkeld, Victoria, as illustrated at <u>Annex 3</u>.
- xii. Dwarf Galaxias the native fish species Galaxiella pusilla, protected under the EPBC Act.
- xiii. Dwarf Galaxias habitat in-stream habitat and fringing vegetation along sections of Hopkins river, Billy Billy Creek and/or Mount Ernu Creek within the project area.
- xiv. EPBC Act the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).
- xv. **GEWVVP** the ecological community *Grassy Eucalypt Woodland of the Victorian Volcanic Plain* protected under the **EPBC Act**.
- xvi. GEWVVP Offset an area of land secured in perpetuity to compensate for impacts on GEWVVP as a result of the action.
- xvii. GEWVVP Offset Management Plan the document developed by a suitably qualified ecologist to the satisfaction of the Department, detailing the long-term management of GEWVVP at the GEWVVP Offset(s).
- xviii. Golden Sun Moth the native moth species Synemon plana, protected under the EPBC Act.

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| xix. | Golden Sun Moth habitat - is any grassland (exotic and native) that may be utilised by the Golden Sun Moth at any stage of its life cycle. |
|---------|---|
| xx. | Golden Sun Moth Offset - an area of land secured in perpetuity to compensate for impacts on Golden Sun Moth as a result of the action. |
| xxi. | Golden Sun Moth Offset Management Plan - the document developed by a suitably qualified ecologist to the satisfaction of the Department, detailing the long-term management of Golden Sun Moth populations and habitat at the Golden Sun Moth Offset(s). |
| xxii. | Impact(ing) - adverse impact by cutting down, felling, thinning, logging, removing, killing, destroying, smothering, poisoning, ringbarking, uprooting or burning. |
| xxiii. | Landowner – the person(s) and/or company who legally owns the property that is secured as an offset site for the long-term management and protection of EPBC Act listed matters. |
| xxiv. | Minister - the Minister administering the EPBC Act and includes a delegate of the Minister. |
| XXV. | No-go zone(s) - clearly delineated area(s) of conservation value, to be avoided by |
| xxvi. | NTGVVP - the ecological community Natural Temperate Grassland of the Victorian Volcanic Plain protected under the EPBC Act. |
| xxvii. | NTGVVP Offset - an area of land secured in perpetuity to compensate for impacts on NTGVVP as a result of the action. |
| xxviii. | NTGVVP Offset Management Plan - the document developed by a suitably qualified ecologist to the satisfaction of the Department, detailing the long-term management of NTGVVP at the NTGVVP Offset(s). |
| xxix. | Offset attributes - an '.xls' file capturing relevant attributes of the offset site, including the EPBC reference ID number, the physical address of the offset site, coordinates of the boundary points in decimal degrees, the EPBC Act protected matters that the offset compensates for, any additional EPBC Act protected matters that are benefiting from the offset, and the size of the offset in hectares. |
| XXX. | Project area - the footprint area where the proposed action will occur, as illustrated at Annex 1. |
| xxxi. | Shapefile - an ESRI Shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes including at least the EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format. |
| xxxii. | Spiny Rice-flower - the native flora species Pimelea spinescens subsp. spinescens, protected under the EPBC Act. |
| xxxiii. | Spiny Rice-flower patch - the patch(s) of habitat for the Spiny Rice-flower within the project area as illustrated at Annex 1. |
| xxxiv. | Striped Legless Lizard - the native lizard species Delma impar, protected under the EPBC Act. |
| XXXV. | Substantially commence(d) - commencement of construction of the road surface or bridges. This does not include preparatory works. |
| xxxvi. | Suitably qualified ecologist - practising ecologist with tertiary qualifications from a recognised institute with at least three years of field experience undertaking fauna and flora surveys. |
| xxxvii. | The funds – the monetary value that forms the basis of payment for environmental services of the Contingency Offset |

| xxxviii. | Threatened Species Management Plan - the document entitled Western Highway Project |
|----------|--|
| | Section 2: Beaufort to Ararat, Victoria, Threatened Species Management Plan, dated |
| | October 2013 prepared in compliance with the Victorian condition of approval for this |
| | proposal. |
| xxxix. | Titles Office - the relevant authority responsible for registering land title transaction. |
| xl. | Trust for Nature - the Trust for Nature (Victoria) as established and defined by the Victorian |
| | Conservation Trust Act 1972 (Victoria). |
| xli. | Weed management Plan - the document titled final report Weed Management Plan, |
| | Western Highway Duplication Project - Section 2. Beaufort to Ararat, Victoria, dated |
| | June 2013 as per Annex 4 |

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Streamline Research Pty. Ltd.

ABN. 66 006 870 908 83 Orchard Ave Eltham, 3095. Tel. (03) 9439 7785. Fax (03) 9439 7339. 3 June 2014

Harry Ostapiw Senior Project Officer Western Highway Project VicRoads P.O. Box 148 Wendouree, Vic. 3355

Re: Dwarf galaxias Conservation Management Plan for the Western Highway Project Section 2 – Beaufort to Ararat ((Reference Number EPBC 2010/5741)

Streamline Research has completed a dwarf galaxias Conservation Management Plan (CMP) for the Western Highway Project Section 2 – Beaufort to Ararat (EPBC referral 2010/5741). The Plan has addressed issues raised for the conservation and enhancement of dwarf galaxias habitat in accordance with requirements of the federal Department of the Environment (letter dated 17 April 2014).

Each of the conditions raised by the federal Department of the Environment with respect to the dwarf galaxias is addressed below:

Base line data and other supporting evidence that documents the baseline condition of populations of Dwarf Galaxias habitat and populations within the project area

In May 2014 Streamline Research undertook a targeted dwarf galaxias investigation of all waterways that cross the proposed route of the duplication of the Western Highway between Beaufort to Ararat. Unlike previous aquatic work which only made comments upon waters which were surveyed (Ecology & Heritage Partners, 2012) the targeted dwarf galaxias investigation addressed in the dwarf galaxias CMP assesses each water according to potential for support dwarf galaxias populations and providing habitat for the species.

Most waters located on the proposed duplication of the Western Highway between Beaufort and Ararat were found to be intermittent or ephemeral in nature. As such, they could at best only be used temporarily, if at all, by dwarf galaxias. Dwarf galaxias were found in two waters, Fiery Creek and Billy Billy Creek and mitigation measures in the CMP that align with those suggested by the Commonwealth will ensure that these populations and habitats will not be adversely affected by the proposed road works. Specific management actions to maintain and/or improve Dwarf Galaxias populations and habitat within the project area, including but not limited to details of

• establishing no-go zone(s) with a minimum 3m buffer around Dwarf Galaxias habitat. Clearly marked no-go zone(s) with high visibility fencing and signage for at least the duration that construction activities are within 100m of the no go zone(s)

The dwarf galaxias CMP has recommended that 'No Go Zones' be placed around dwarf galaxias habitat in Fiery Creek and Billy Billy Creek. Buffers of 10 metres from the top of the bank from each side of these waterways should be sufficient to protect riparian vegetation, prevent erosion and protect instream habitat. High visibility fencing and signage 100 metres from the 'No Go Zones' is to be clearly marked and is to remain in place for the duration of construction work.

• how any pipes, culverts and/or bridges constructed within Dwarf Galaxias habitat will not restrict connectivity or hinder the dispersal of Dwarf Galaxias

The dwarf galaxias CMP makes consideration of all crossings of watercourses. Fish passage is necessary for the dispersal of dwarf galaxias into new habitats during flood periods, but it is equally important to all fish species found in the study area. No new structures will be placed into waterways which will restrict fish movement. Oversized culverts are recommended for low order streams with small streamflows. Waters with larger streamflows (typically named creeks and rivers) are expected to have bridge crossings. VicRoads is to have bridge crossings of Fiery Creek, Middle Creek, Charliecombe Creek and the Hopkins River.

Bridge construction and 'No Go Zones' planned for Fiery Creek will ensure that opportunity for connectivity of dwarf galaxias in the creek will not be compromised by works undertaken during the duplication of the Western Highway.

Bridge construction previously considered for Billy Billy Creek for the crossing to the north of Buangor (Ecology & Heritage Partners, 2013) is not considered a necessary requirement needed to provide connectivity of the Billy Billy Creek dwarf galaxias population. As the upstream catchment is quite small, culverts may be suitable, as has previously been used at the crossing of the Western Highway to the west of Buangor (approximately two kilometres further upstream on the Western Highway).

• a commitment to avoid construction activities within Hopkins River or Billy Billy Creek crossings during the Dwarf Galaxias breeding period (from 1 April to 30 November in any year)

It would appear to be totally unnecessary to place this constraint on the works proposed for the duplication of the Western Highway between Beaufort to Ararat. No actions taken for road construction are expected to prevent or restrict dwarf galaxias breeding.

With the exception of a historical record from 1904 (in Ecology & Heritage Partners, 2012), dwarf galaxias have not been found in the Hopkins River in either the surveys made in 2011 and 2012 or in the targeted survey made in May 2014. Furthermore, in the recent investigation no water was found in the main channel of the Hopkins River. Not even remnant pools were evident. Pooled water in the channel was first observed approximately five kilometres south of the Western Highway.

With a bridge crossing proposed for the Hopkins River, no water in the channel and no known population of dwarf galaxias in the past century, a restriction on construction activities would appear pointless, as it would not result in any benefit to the dwarf galaxias.

Currently, the dwarf galaxias population in Billy Billy Creek is restricted to the pool that is under the existing Western Highway, approximately 600 m south of the proposed works area on Billy Billy Creek. As there is no water in the channel to the north where the road works are to be conducted, dwarf galaxias have no opportunity for currently using this area for breeding during 2014. Even in the event that rain resulted in the presence of surface water and connectivity with the downstream dwarf galaxias population occurred, the 'No Go Zones' will ensure that disruption to possible dwarf galaxias breeding does not occur.

Streamline Research does not agree with the findings of Ecology & Heritage Partners, (2012) that there is suitable habitat for dwarf galaxias in Cemetery Creek, Green Hill Creek, the Hopkins River, Middle Creek, as well as several smaller, unnamed drainage lines and dams. If dwarf galaxias were to ever utilise these habitats it could only be on a temporary basis as all are ephemeral or intermittent waters. No permanent habitat for dwarf galaxias populations is found in any of these waters on the alignment of the proposed works for the Western Highway Project between Beaufort and Ararat.

• a procedure for isolating Dwarf Galaxias habitat, and procedure for salvage and relocating Dwarf Galaxias, in the event that construction activities occur within Dwarf Galaxias habitat

There is no need for dwarf galaxias to be salvaged or relocated for the duplication of the Western Highway Project between Beaufort and Ararat. Dwarf galaxias habitat that has been identified (in Fiery Creek and Billy Billy Creek) will be protected whilst works are undertaken. 'No Go Zones' will be sufficient in protecting the dwarf galaxias populations and habitat of these waters.

The concept of salvaging dwarf galaxias is not one that would be recommended by Streamline Research unless a waterway was to be totally modified by proposed works. VicRoads has successfully undertaken works in areas where dwarf galaxias have occurred like the Pakenham Bypass (EPBC 2001/536), the South Gippsland Highway (EPBC 2009/4959) and the Princes Highway Duplication (EPBC 2010/4959). In all of these works, appropriate mitigation measures have been used to ensure that there has been no necessity to salvage or relocate dwarf galaxias.

• the method and schedule for water quality monitoring of dwarf galaxias habitat during construction activities

Included as a mitigation measure in the dwarf galaxias CMP.

• a plan and schedule for revegetation, rehabilitation and weed removal works within Dwarf Galaxias habitat, including establishment of in-stream habitat with suitable features such as woody debris and native riparian and aquatic species impacted by the proposed action

Given that dwarf galaxias habitat will not be compromised by the proposed road works, revegetating and rehabilitation should not be required. Furthermore, instream conditions for the dwarf galaxias will remain unchanged by bridge works. 'No Go Zones' will protect known habitat for the dwarf galaxias.

• implement sediment, erosion and pollution controls with Construction Techniques for Sediment Pollution Controls (EPA Publication No. 275, 1991); and Environmental Guidelines for Major Constructions Sites (EPA Publication No. 480, February 1996)

Sediment erosion and pollutions controls have been included in the dwarf galaxias CMP.

• ensuring chemicals and fuels are stored and handled in accordance with the relevant Material Safety Data Sheets. Ensuring chemicals and fuels are not stockpiled within 100m of waterways, and a spill kit must be kept onsite for the duration of construction. Implementing an emergency response procedure in the event of a chemical or fuel spill near waterways

Appropriate mitigation measures are included in the dwarf galaxias CMP.

Information and commitments about monitoring and reporting on the improvements in the condition of the project area

Included in the dwarf galaxias CMP.

Corrective actions and contingency measures to be implemented where monitoring under the Threatened Species Management Plan indicates a degradation of Dwarf Galaxias habitat

Also included in the dwarf galaxias CMP.

Conditions attached to the approval included a revision of the Threatened Species Management Plan for conservation and enhancement of Dwarf Galaxias habitat. Attached is a dwarf galaxias CMP which has been written in accordance with the requirements set out by the federal Department of the Environment. I hope that the revised plan meets with the Ministers approval.

John McGuckin Director Streamline Research



Appendix 2. Maps of waterways survey points (Beaufort to Ararat)





































Appendix 3. Photographs of waterway survey points (Beaufort to Ararat)

Site 1. Trawalla Creek tributary at Western Highway- north (left) and south (right).



Site 2. Trawalla Creek tributary at Western Highway- north (left) and south (right).



Site 3. Trawalla Creek tributary at Western Highway- north (left) and south (right).



Site 4. Trawalla Creek tributary - south of Western Highway.



Site 5. Fiery Creek tributary - south of Western Highway.



Site 6. Fiery Creek tributary - north of Western Highway.



Site 7. Fiery Creek tributary – south of Western Highway.



Site 8. Fiery Creek tributary Eurambeen Raglan Road – west (left) and east (right).



Site 9. Fiery Creek tributary Eurambeen Raglan Road – west (left) and east (right).



Site 10. Fiery Creek at Western Highway – north (left) and south (right).



Site 11. Middle Creek tributary at Western Highway – north (left) and south (right).



Site 12. Middle Creek tributary at Western Highway – north (left) and south (right).



Site 13. Middle Creek at Western Highway – north (left) and south (right).



Site 14. Middle Creek tributary at Western Highway – north (left) and south (right).



Site 15. Charliecombe Creek tributary at Waldrons Road – north (left) and south (right).



Site 16. Charliecombe Creek tributary at Western Highway – north (left) and south (right).



Site 17. Charliecombe Creek tributary at Western Highway – north (left) and south (right).



Site 18. Charliecombe Creek tributary at Western Highway – north (left) and south (right).



Site 19. Charliecombe Creek tributary at Anderson Road – west (left) and east (right).



Site 20. Charliecombe Creek tributary at Anderson Road – west (left) and east (right).



Site 21. Charliecombe Creek tributary at Western Highway – north (left) and south (right).



Site 22. Billy Billy Creek tributary at Peacocks Road – west (left) and east (right).



Site 23. Billy Billy Creek tributary at Western Highway – west (left) and east (right).



Site 24. Billy Billy Creek on alignment 600 metres north of Western Highway.



Site 25. Billy Billy Creek 500 metres north of Western Highway.



Site 26. Billy Billy Creek at Western Highway – north (left) and south (right).



Site 27. Billy Billy Creek at Buangor rail line- north (left) and south (right).


Site 28. Billy Billy Creek at Western Highway west of Buangor – north (left) and south (right).



Site 29. Billy Billy Creek at Pope Road – west (left) and east (right).



Site 30. Billy Billy Creek tributary at Western Highway – north (left) and south (right).



Site 31. Billy Billy Creek tributary at rail line.



Site 32. Gorrin Creek tributary at Hillside Road.



Site 33. Gorrin Creek tributary at Hillside Road.



Site 34. Hopkins River tributary at Langi Ghiran Picnic Ground Road – west (left) and east (right).



Site 35. Hopkins River tributary at Brady Road.



Site 36. Hopkins River at Western Highway – north (left) and south (right).



Site 37. Gorrin Creek at the Hopkins River junction, Dobie Road – west (left) and east (right).



Site 38. Hopkins River tributary, south of Western Highway.



Site 39. Greenhill Creek at Western Highway – north (left) and south (right).



Site 40. Hopkins River tributary south of Western Highway.



Site 41. Cemetery Creek at Western Highway – north (left) and south (right).

| Site | Waterway | Location | East | North | Aquatic habitat | Connection |
|------|-----------------------------------|----------------------------------|--------|---------|-----------------|---------------|
| 1 | Trawalla Creek tributary | Western Highway | 708585 | 5855289 | dry channel | |
| 2 | Trawalla Creek tributary | Western Highway | 707912 | 5855488 | dry channel | Connected |
| 3 | Trawalla Creek tributary | Western Highway | 707802 | 5855532 | pools | tributaries |
| 4 | Trawalla Creek tributary | Western Highway | 707062 | 5855956 | dry channel | |
| 5 | Fiery Creek tributary east | Western Highway | 706229 | 5856586 | dry channel | Connected |
| 6 | Fiery Creek tributary east | Western Highway | 705933 | 5856761 | 2 farm dams | tributaries |
| 7 | Fiery Creek tributary east | Western Highway | 704407 | 5873890 | dry channel | |
| 8 | Fiery Creek tributary north | Eurambeen Raglan Road | 705094 | 5858230 | farm dam | Connected |
| 9 | Fiery Creek tributary north | Eurambeen Raglan Road | 703862 | 5857746 | dry channel | tributaries |
| 10 | Fiery Creek | Western Highway | 703630 | 5857895 | pools | Main channel |
| 11 | Middle Creek tributary east | Western Highway | 700716 | 5859100 | dry channel | Connected |
| 12 | Middle Creek tributary east | Goulds Lane | 699696 | 5858384 | dry channel | tributaries |
| 13 | Middle Creek | Western Highway | 699279 | 5859645 | pools | Main channel |
| 14 | Middle Creek tributary west | Western Highway | 698966 | 5859764 | dry channel | tributary |
| 15 | Charliecombe Creek tributary east | Waldrons Road | 698196 | 5860609 | dry channel | Connected |
| 16 | Charliecombe Creek tributary east | Western Highway | 697401 | 5860340 | dry channel | tributaries |
| 17 | Charliecombe Creek tributary east | Western Highway | 695700 | 5861024 | dry channel | |
| 18 | Charliecombe Creek | Western Highway | 695442 | 5861118 | one pool | Connected |
| 19 | Charliecombe Creek tributary west | Anderson Road | 695004 | 5863390 | dry channel | tributaries |
| 20 | Charliecombe Creek tributary west | Anderson Road | 693978 | 5861997 | dry channel | |
| 21 | Charliecombe Creek tributary west | Western Highway | 693613 | 5861833 | dry channel | |
| 22 | Billy Billy Creek tributary east | Peacocks Road | 693287 | 5863043 | dry channel | One tributary |
| 23 | Billy Billy Creek tributary east | Western Highway | 692745 | 5862124 | dry channel | |
| 24 | Billy Billy Creek | 600 m north of Western Highway | 692402 | 5862821 | dry channel | Main channel |
| 25 | Billy Billy Creek | 500 m north of Western Highway | 692493 | 5862608 | pools | |
| 26 | Billy Billy Creek | Western Highway | 692591 | 5862242 | pools | |
| 27 | Billy Billy Creek | Southern side of rail line | 692491 | 5861992 | pools | |
| 28 | Billy Billy Creek tributary west | Western Highway, west of Buangor | 690086 | 5863667 | dry channel | Connected |
| 29 | Billy Billy Creek tributary west | Pope Road | 688721 | 5864150 | dry channel | tributaries |
| 30 | Billy Billy Creek tributary west | Western Highway | 687996 | 5865074 | dry channel | |
| 31 | Billy Billy Creek tributary west | Northern side of rail line | 687839 | 5864639 | dry channel | |
| 32 | Gorrin Creek tributary | Hillside Road | 686874 | 5864747 | dry channel | Connected |
| 33 | Gorrin Creek tributary | Hillside Road | 681484 | 5866921 | dry channel | tributaries |
| 34 | Hopkins River tributary | Langi Ghiran Picnic Ground Road | 683125 | 5867720 | dry channel | Connected |
| 35 | Hopkins River tributary | Brady Road | 680329 | 5868680 | dry channel | tributaries |
| 36 | Hopkins River | Western Highway | 678836 | 5868767 | dry channel | Main channel |
| 37 | Gorrin Creek | At Hopkins River, Dobie Road | 678270 | 5868274 | dry channel | tributary |
| 38 | Hopkins River tributary | Western Highway | 674933 | 5870246 | dry channel | tributary |
| 39 | Greenhill Creek | Western Highway | 674643 | 5870447 | dry channel | tributary |
| 40 | Hopkins River tributary | Western Highway | 674005 | 5870841 | dry channel | tributary |
| 41 | Cemetery Creek | Western Highway | 673105 | 5871592 | dry channel | tributary |

Appendix 4. Grid references of waterway survey points (Beaufort to Ararat)

Appendix 5. Dwarf galaxias and Fiery Creek works



Should you require further information, please contact Michael Wickerson from this office (Tel: 03 5309 1075) would be pleased to assist.

Yours sincerely

MICHAEL McCARTHY **PROJECT DIRECTOR - WESTERN HIGHWAY**

Enclosed: Attachment 1- Fiery Creek location Attachment 2- Fiery Creek detailed design Attachment 3- Proposed No Go Zones at Fiery Creek Attachment 4- Section 177 PART D Erosion and Sediment Controls









VicRoads Attachment 4

PART D - EROSION AND SEDIMENT CONTROL

177.D1 EROSION AND SEDIMENT CONTROL

(a) General

All exposed surfaces shall be free of or treated to minimise erosion.

Erosion and sediment controls shall include but are not limited to:

- minimising the amount of exposed erodible surfaces during construction including the staging of works;
- prompt temporary and/or permanent progressive revegetation of the site as work proceeds;
- prompt covering of exposed surfaces (including batters and stockpiles) that would otherwise remain bare for more than ##28: days. Cover may include mulch, erosion control mat or seeding with sterile grass;
- installation, stabilisation and maintenance of catch and diversion drains that segregate water runoff from catchments outside of the construction site from water exposed to the construction site;
- installation and maintenance of erosion and sedimentation controls, established in accordance with EPA best practice guidelines for the treatment of sediment laden run-off resulting from construction activities;
- adequately control and route runoff within the construction site to the appropriate sedimentation controls; and
- where trees are required to be removed more than two months in advance of any construction works, remove only that part of the tree that is above ground level and where possible allow the roots to remain intact beneath the ground surface to assist with erosion control.

(b) Work in/near Waters

Works shall be programmed and managed to avoid work in waters. Where work in waters is unavoidable, procedures shall be developed and implemented to satisfy the requirements of the specification and as required by any permits from the responsible authority(s).

Where construction activities are undertaken in, near or over waters, EMPs shall be prepared to protect beneficial uses in accordance with any permit, the *State Environmental Planning Policy (Waters of Victoria)* its schedules and best practice guidelines.

(c) Sedimentation Basins

Sedimentation basins shall be utilised as the primary sediment control for the works unless the Contractor can demonstrate to the Superintendent's satisfaction that the implementation of a sedimentation basin is not technically feasible for the works.

Where sedimentation basins are proposed as control measures, basins shall be designed to contain flows from a rainfall event having an Average Recurrence Interval of not less than two years and six hour duration when allowing for a 30% reduction in capacity as a result of sediment accumulation.

Sedimentation basins shall be modelled and sized to manage rainfall intensities and soil characteristics specific to the region. The sizing and modelling of sedimentation basin(s) shall consider the expected works and associated area of disturbance within catchment area(s) within the site.

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The sizing and modelling of temporary sedimentation basins shall be undertaken using recognised 'best practice' modelling techniques or '*VicRoads Temporary Sedimentation Basin Sizing Tool*'.

Spillways or bypass systems (installations that divert all clean surface flows around a works site) shall be designed for an event having an Average Recurrence Interval of five years.

An independent hydraulic consultant who has demonstrated competence and suitable experience in the design of temporary sedimentation basins shall complete and sign a declaration in accordance with Attachment C to this Section 177. The declaration shall accompany submission of the sedimentation basin designs to the Superintendent.

HP

The Contractor shall submit to the Superintendent the sedimentation designs and the associated independent verification declarations not less than two weeks prior to the commencement of construction of the temporary sedimentation basin.

Sedimentation basins shall be cleaned out whenever the accumulated sediment has reduced the capacity of the basin by 30% or more, or whenever the sediment has built up to a point where it is less than 500 mm below the spillway crest, whichever occurs earlier.

The Contractor shall maintain the capacity of the sedimentation basin and shall ensure compliance with Clause 177.B1(b)(ii) if dewatering to a waterway.

(d) Stockpiles

Where soil is stockpiled on site, such stockpiles shall be located, where possible, to provide a clearance of not less than 10 m from waterways. Where it is not possible to provide a clearance of 10 m, the stockpile shall be above the normal high water level of the waterways and additional protection shall be provided to prevent the stockpiled material entering the waterways.

(e) Monitoring

The Contractor shall inspect the whole site for instances of soil erosion or scour and the effectiveness of erosion and sedimentation controls in accordance with the following:

- at intervals not more than seven days;
- within one hour of the commencement of any runoff resulting from rain events during working hours;
- every four hours during periods of continuous rain during working hours;
- within 12 hours of a rain event outside working hours.

Any defects and/or deficiencies in control measures identified by monitoring undertaken shall be rectified immediately and these control measures shall be cleaned, repaired and augmented as required to ensure effective control.

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Australian Government Department of the Environment

Mr Michael McCarthy Project Director - Western Highway Project VicRoads PO Box 148 WENDOUREE VIC 3355

| Date Beceived 6 14 | |
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Dear Mr McCarthy

Western Highway Project, Section 2, Beaufort to Ararat, Victoria (EPBC 2010/5741)

Thank you for your letter dated 6 June 2014, providing an update on the project Western Highway Project, Section 2, Beaufort to Ararat, Victoria (EPBC 2010/5741), approved under the *Environment Protection and Biodiversity Conservation Act 1999* on 17 April 2014.

In your letter, you state that surveys have been undertaken by a suitably qualified ecologist to inform the updated Dwarf Galaxias Management Plan required under condition 4 of the approval decision notice. You note the surveys identified a small isolated population of Dwarf Galaxias at Fiery Creek, not previously identified by targeted surveys undertaken for the assessment documentation. The population is described as not a primary source of Dwarf Galaxias, located in an isolated pond approximately 3m by 2m within a highly disturbed river bank with no fringe vegetation.

The Department notes that the action, as described in the referral documentation and approval notice, will not involve in-stream works at Fiery Creek or clearing of habitat for the Dwarf Galaxias, and includes a commitment to appropriate sediment and erosion controls along with water quality monitoring. Based on the information in the letter, and the commitments in the design of the approved action, I consider that the population of Dwarf Galaxias at Fiery Creek is not a significant population, and is appropriately managed by existing controls. I consider the action is in accordance with existing approval conditions and no further conditions are required.

If you have any questions about this advice, please contact the project manager, Jackie Lyons, by email to <u>jackie.lyons@environment.gov.au</u>, or telephone (02) 6274 2793 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

James Tregurtha Assistant Secretary South-Eastern Australia Environment Assessments Branch

12 June 2014

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Appendix 6. Bridge and culvert drawings for Billy Billy Creek

The new Billy Billy Creek bridge and "No Go Zones' on the Western Highway, north of Buangor.



The new Billy Billy Creek culvert on the Western Highway, west of Buangor.

Appendix 7. Specification for Water Quality and Sediment Controls

1200.04 WATER

(a) General

The quality of water in waterways shall not be detrimentally impacted by runoff from the site.

(b) Monitoring

(i) General

Water quality and rainfall shall be monitored for the parameters identified in Table 1200.041 during all stages of construction to ensure that the water quality in the receiving waterways:

- does not deteriorate between the upstream and downstream limits of the work site during the construction period (where upstream results become the background limits) the allowable variation between results shall be no more than twice the measurement uncertainty; or
- is as agreed between the Contractor, the Superintendent and EPA.

The Contractor shall provide and maintain equipment capable of providing instantaneous monitoring of parameters as required in Table 1200.041 and have such equipment available on-site at all times. All equipment associated with monitoring shall be maintained and calibrated in accordance with the manufacturer's or equipment supplier's requirements.

| Parameter | Method | | | | |
|--|--|--|--|--|--|
| Turbidity – NTU | Measure with on-site meter | | | | |
| Electrical Conductivity (EC) – μ S/cm | Measure with on-site meter | | | | |
| рН | Measure with on-site meter | | | | |
| Dissolved oxygen (DO) – mg/L | Measure with on-site meter | | | | |
| Temperature - °C | Measure with on-site meter | | | | |
| Litter (definition, including solid inert waste) | Visual (prevent litter from entering waterways and drainage systems) | | | | |
| Oils and Greases | Visual (No visible free oil or greases) | | | | |
| Rainfall | Measure with on-site meter capable of logging rainfall at a minimal interval of 10 minutes | | | | |

Table 1200.041 Construction Monitoring

(ii) Dewatering

Water quality monitoring shall be undertaken when dewatering ponded water to receiving waterways.

The quality of ponded water to be dewatered to receiving waterways shall not exceed 30 NTU or shall be equal to or better than the water quality in the receiving waterways if the turbidity in the receiving waterway is less than 30 NTU.

The pH of ponded water to be dewatered shall be within the range of 6.4 - 7.7.

(iii) Bypass Pumping

Water quality monitoring shall be undertaken when bypass pumping water around works that is being undertaken within a waterway.

(iv) Locations

Monitoring shall be carried out at locations as follows:

- in waterways and/or drainage infrastructure upstream and downstream of the limits of the Site; and
- at appropriate locations in waterways within the Site including immediately upstream and downstream of each point source (or flow) entering along the length of waterways within the Site.

Details of all monitoring locations shall be maintained on the scaled drawings associated with the EMP. Monitoring sites must be accessible during all on-site activity and in all weather conditions.

Monitoring for dewatering activities will be undertaken at locations as follows:

- the ponded water at the pump intake; and
- in the receiving waterways and/or drainage infrastructure immediately upstream and downstream of the discharge point (within the mixing zone of the waterway and discharged water).

Monitoring for bypass pumping activities will be undertaken at locations immediately upstream and downstream of the pumping activity.

(v) Timing

Monitoring shall be undertaken:

- immediately prior to work commencing;
- fortnightly, except for Billy Billy Creek where monitoring shall be weekly;
- for each rain event as follows:
 -within one hour of commencement of the rain event during working hours,
 -every 4 hours for periods of continuous rain during working hours, and
 -within 12 hours of a rain event, outside working hours;
- immediately prior to the commencement of and then hourly during dewatering and bypass pumping activities.

1200.08 EROSION AND SEDIMENT CONTROL

(a) General

All exposed surfaces shall be free of or treated to minimise erosion.

Erosion and sediment controls shall include but are not limited to:

- minimising the amount of exposed erodible surfaces during construction including the staging of works;
- prompt temporary and/or permanent progressive revegetation of the Site as work proceeds;
- prompt covering of exposed surfaces (including batters and stockpiles) that would otherwise remain bare for more than 28 days cover may include mulch, erosion control mat or seeding with sterile grass;
- installation, stabilisation and maintenance of catch and diversion drains that segregate water runoff from catchments outside the construction site from water exposed to the construction site;
- installation and maintenance of erosion and sedimentation controls, established in accordance with EPA best practice guidelines for the treatment of sediment laden run-off resulting from construction activities;
- adequately control and route runoff within the construction site to the appropriate sedimentation controls; and
- where trees are required to be removed more than two months in advance of any construction works, remove only that part of the tree that is above ground level and where possible allow the roots to remain intact beneath the ground surface to assist with erosion control.
- (b) Work in/near Waterways

Works shall be programmed and managed so as to avoid work in waterways. Where work in waterways is unavoidable, procedures shall be developed and implemented to satisfy the requirements of this Clause 1200 and as required by any permits from the responsible authority(s).

Where construction activities are undertaken in, near or over waterways, Environmental Management Plan(s) shall be prepared to protect beneficial uses in accordance with any permit, the State Environment Protection Policy (Waters of Victoria), its schedules and best practice guidelines.

Any work in waterways shall be limited to times when the waterway is in a low flow or in a no-flow condition, except where permission is obtained from the Glenelg-Hopkins Catchment Management Authority (GHCMA).

(c) Sedimentation Basins

Sedimentation basins shall be used as the primary sediment control for the works unless the Contractor can demonstrate that the implementation of a sedimentation basin is not technically feasible for the works. Where sedimentation basins are proposed as control measures, basins shall be designed to contain flows from a rainfall event having an Average Recurrence Interval of not less than 2 years and 6 hours duration when allowing for a 30% reduction in capacity as a result of sediment accumulation.

Sedimentation basins shall be modelled and sized to manage rainfall intensities and soil characteristics specific to the region shall be used. The sizing and modelling of sedimentation basin(s) shall consider the expected works and associated area of disturbance within catchment areas(s) within the site.

The sizing and modelling of temporary sedimentation basins shall be undertaken utilising recognised 'best practice' modelling techniques or by utilising 'VicRoads Temporary Sedimentation Basin Design Tool'.

Spillways or bypass systems (installations that divert all clean surface flows around a works site) shall be designed for an event having an Average Recurrence Interval of 5 years.

An independent hydraulic consultant who has demonstrated competence and suitable experience in the design of temporary sedimentation basins, shall complete and sign a declaration of this specification. The declaration shall accompany submission of the sedimentation basin designs to the Superintendent.

HP The Contractor shall submit to the Superintendent the temporary sedimentation designs and the associated independent verification declarations not less than 2 weeks prior to the commencement of construction of the temporary sedimentation basin.

Sedimentation basins shall be cleaned out whenever the accumulated sediment has reduced the capacity of the basin by 30 percent or more, or whenever the sediment has built up to a point where it is less than 500mm below the spillway crest, whichever occurs earlier.

The Contractor shall maintain the capacity of the sedimentation basin and shall ensure compliance with Clause 1200.04(b)(ii) if dewatering to a waterway.

(d) Stockpiles

Where soil is stockpiled on Site, such stockpiles shall be located, where possible, to provide a clearance of not less than 10 metres from waterways. Where it is not possible to provide a clearance of 10 metres, the stockpile shall be above the normal high water level of the waterways and additional protection shall be provided to prevent the stockpiled material entering the waterways.

(e) Monitoring

The Contractor shall inspect the whole Site for instances of soil erosion or scour and the effectiveness of erosion and sedimentation controls in accordance with the following:

- at intervals not more than 7 days;
- within one hour of the commencement of any runoff resulting from rain events during working hours;
- every 4 hours during periods of continuous rain during working hours; and
- within 12 hours of a rain event outside working hours.

Any defects and/or deficiencies in control measures identified by monitoring undertaken shall be rectified immediately and these control measures shall be cleaned, repaired and augmented as required to ensure effective control thereafter.